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PROVISIONAL INTELLIGENCE REPORT

CONSTRUCTION OF EUROPEAN SATELLITE GROSS NATIONAL PRODUCT ACCOUNTS

CIA/RR PR-111
15 April 1955

CENTRAL INTELLIGENCE AGENCY
OFFICE OF RESEARCH AND REPORTS

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ATTENTION : [redacted]

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15 April 1955

MEMORANDUM FOR: Chief, St/I/C

ATTENTION : [redacted]

FROM : Chief, St/PC

SUBJECT : Dissemination of CIA/RR PR-111, European Satellites National Economic Accounts (Project 13.117)

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PROVISIONAL INTELLIGENCE REPORT

CONSTRUCTION OF EUROPEAN SATELLITE GROSS NATIONAL PRODUCT ACCOUNTS

CIA/RR PR 111

(ORR Project 13.117)

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The data and conclusions contained in this report do not necessarily represent the final position of ORR and should be regarded as provisional only and subject to revision. Comments and data which may be available to the user are solicited.

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FOREWORD

In recent years the intelligence community has levied increasing demands upon research staffs for national economic aggregates. This report explains the construction of the comprehensive estimates of the principal economic aggregates of individual Satellite countries published in CIA/RR PR-99, Economic Conditions in the European Satellites, 11 February 1955. S, US OFFICIALS ONLY. This set of estimates covers one prewar year, 1938, and the postwar years, 1948-53. The report describes the problems involved and the methods used in the estimation of these aggregates. It also makes available (in the appendixes) a reservoir of basic data, susceptible to continuous revision, which may be drawn upon to extend and to improve the accuracy of estimates for the subject area.

This report is being issued because of its value to counterpart analysts concerned with the methodology employed and with the basic data problems encountered in the construction of aggregate estimates of the European Satellite economies. Substantially the same methods are being used in current research, which will result in the publication of new aggregate estimates.

The estimates of gross national product presented in this report are the most significant single indicators of the productive ability of the European Satellite economies. They are given in terms of US dollars, both for 1938 and for the years 1948-53, in order to permit comparison among the Satellite economies. They are only roughly comparable with US figures or with estimates made for the USSR in terms of dollars, because they have not been adjusted for this purpose. For analysis and interpretation, readers are referred to CIA/RR PR-99.

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CIA/RR PR-111
(ORR Project 13.117)

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CONSTRUCTION OF EUROPEAN SATELLITE GROSS NATIONAL PRODUCT ACCOUNTS*

Summary

National accounts series are designed to measure national economic achievement through time. The annual gross national product is the principal aggregate used for this purpose. The gross national product (GNP) is the sum of the values, at market prices, of all goods and services produced by an economy, including the value of the capital goods partially consumed in the production process. It thus measures the totality of economic effort and constitutes the principal current measure of the productive capability of an economy. GNP estimates should be used, however, with appreciation of their limitations, especially in comparing the achievements or productive capabilities of different economies or in developing intertemporal comparisons over a long period within a given economy.

The postwar national accounts estimates developed in this report rest upon prewar figures for the Eastern European countries, which have been manipulated to serve as base-year estimates. Accounts for at least 1 prewar year for each country have been analyzed carefully and adjusted to US national accounting practices. The local currency estimates thus obtained have been converted to a common value unit (1925-34 US dollars). These estimates, in turn, have been converted to 1951 US dollars in order to facilitate international comparisons for recent years. Finally, in order to use these estimates as base-year figures in developing postwar estimates, they have been adjusted to postwar national boundaries.

For the purpose of constructing indexes of GNP with which to move the base-year estimates, production indexes have been developed from estimates of physical output. Estimates of output for a representative series of goods and services have been aggregated at progressively more inclusive levels, the final level of aggregation being GNP. In

* The estimates and conclusions contained in this report represent the best judgment of ORR as of 1 April 1955. The production data, however, are those used for CIA/RR PR-99 (cut-off date, 30 September 1954).

aggregating production indexes to higher levels, use has been made of the concept of "value added" to eliminate multiple counting.

This procedure is believed to offer the most reliable basis available at the present time for estimating the growth of GNP in the Satellite economies. Satellite output data appear to be generally reliable. In any event, they are presumably no more likely to have been falsified, and they are more complete and are much less liable to misinterpretation, than the official data available on Satellite national accounts.

The procedure used results in further advantage for the study of the Satellite economies. Production indexes have been aggregated at varied levels, resulting in a wide range of indexes below the GNP level of aggregation. These fractional indexes permit more minute examination of the structure of production (frequently required for specific intelligence problems) than is possible by the simple comparison of GNP estimates.

The immediate result of the analysis described above is a series of estimates of GNP in 1951 US dollars for the European Satellites. These are given in Table 1,* together with the roughly comparable figures for the USSR and the US.

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* Table 1 follows on p. 3.

Table 1

Gross National Product
of the European Satellites a/
1938 and 1948-53

Billion 1951 $

Country	1938	1948	1949	1950	1951	1952	1953
Bulgaria	1.0	1.1	1.1	1.2	1.3	1.3	1.4
Czechoslovakia	7.3	7.1	7.6	7.9	8.0	8.2	8.4
East Germany	16.1	8.5	9.3	10.6	11.9	13.0	14.0
Hungary	2.5	2.3	2.6	2.8	3.1	3.2	3.4
Poland b/	14.5	11.6	12.6	13.6	13.8	14.1	14.6
Rumania b/	3.1	2.6	2.6	2.7	3.0	2.9	3.0
European Satellites c/ Total	44.5	33.2	35.8	38.8	41.1	42.7	44.8
USSR d/	71.9	78.5	86.7	96.0	102.5	113.6	117.0
US d/	166.5	277.9	276.9	307.2	329.8	339.9	350.2

a. The GNP concept employed in this table is that employed in US national accounts published by the Department of Commerce. All data are computed on the basis of present international boundaries.
b. The figures for Poland and Rumania are slightly different from those given in CIA/RR PR-99. The changes reflect small corrections in the base-year figures.
c. Not including Albania. Albanian GNP is negligible, probably in the neighborhood of $200,000,000 (1951 US $). Thus its total magnitude would be subsumed in the rounding error of the total Satellite GNP.
d. The figures given for the USSR and the US are only roughly comparable with those for the European Satellites. The figures for the USSR are estimates; those for the US are based on US official figures.

I. Base-Year Estimates.

The first step taken in the construction of the present series of estimates of the European Satellite GNP is the development of base-year estimates. These are estimates of GNP for 1938 in 1951 US dollars for each of the Satellites, adjusted to a postwar territorial basis.

The prewar GNP estimates have been used in determining the Satellites' postwar national accounts because published postwar official national accounts data are incomplete and the methods of calculation used in developing them are dubious. Although some aggregates are published by the individual European Satellites, these data appear irregularly, and there is not a complete set for any year or for any country. Where constant prices are used, some countries use postwar prices; others, prewar prices. Where "national income" aggregates are published, the Satellites use the Communist "net material product" concept, which omits a large amount of services not directly connected with material production. The published announcements do not explain in detail how these aggregates are constructed, and there is no assurance that methodology is consistent either as among the various Satellites or as among different time periods. Thus use of officially published aggregative data is not feasible for making the international and intertemporal comparisons that are needed for intelligence purposes.

The procedure for making the base-year estimates falls into three phases: (1) an estimate of 1938 GNP in local currency, (2) an estimate of 1938 GNP in 1951 US dollars, and (3) the adjustment of both figures to a postwar territorial basis.

Prewar national accounts data for the European Satellites are available from various sources. These have been manipulated so as to conform to the US concept of GNP, by the addition of omitted services, the conversion from a factor-price to a market-price basis, and the adjustment from a net to a gross product basis (including an allowance for capital consumption) as required. The development of dollar estimates depends heavily on the work of Colin Clark, who estimated the national accounts of most of the countries in the world in 1925-34 US dollars, which he called International Units (I.U.). These dollar estimates have been converted to 1951 dollars by the US retail price index and then adjusted for postwar boundary changes, usually on the basis of prewar population and per capita production data.

In the conversion of GNP from local currencies to dollars, no use has been made of official or other foreign exchange rates except for Bulgaria. For the other countries the method used by Colin Clark is based on a direct comparison of internal prices of consumption goods and services in the US with those of each of the other countries for the year 1929. Since comparative price data for investment goods and government services were generally unavailable, Clark assumed that conversion rates for these would be approximately the same as for consumption goods. He obtained over-all conversion ratios of each currency to dollars by weighting the individual commodity and service price ratios by quantities of commodities and services consumed, both in the US and in the other country. These two weighted averages are typically different, since the consumption patterns are different. The geometric mean of these two is the conversion ratio finally adopted.

The price data available to Clark varied in coverage from country to country. Of the Central and Eastern European countries, only Germany had data showing the distribution of consumption expenditure as a whole (for the period 1927-28). For Czechoslovakia, data were available on consumption expenditures in the early 1930's for various income levels of wage and salary earners. For other countries, price data were available on only food, rent, and fuel. Price ratios (dollar to local currency) on these items were adjusted by Clark to total consumption coverage by applying factors (the relationship of the sample of price ratios, the over-all price ratio, and income per head) which he obtained for those countries on which more data were available. For Bulgaria, no price data were available, and Clark employed the foreign exchange rate between the dollar and the leva.

The calculations of base-year estimates for individual countries are presented in Appendix A. Table 2* summarizes the results.

II. Method of Computing Industry, Sector, and GNP Indexes.

A. Introduction.

The second step in constructing the present estimates of European Satellite GNP is the construction of an index with which to move the base-year estimates. This has been done in several stages.

* Table 2 follows on p. 6.

Table 2

Gross National Product
of the European Satellites a/
1938

Country	Local Currency (Billion Units) Unit	Amount	Billion 1951 US $
Bulgaria	1938 leva	62.9	1.0
Czechoslovakia	1938 koruna	65.5	7.3
East Germany	1938 RM	25.0	16.1
Hungary	1938 pengoes	6.6	2.5
Poland	1938 zloty	26.7	14.5
Rumania	1929 lei	224.0	3.1
European Satellites			44.5

a. Not including Albania.

First, production indexes for about 100 commodities have been constructed and grouped into 22 industry or industry groups. Aggregation at this level involves the valuation of production in terms of constant prices, so that the resulting values can be summed and compared over time.

After industry indexes are computed, there is an aggregation problem involved in grouping related indexes into six income-originating sectors of GNP. The methodology of aggregation varies from very simple, as for the agriculture sector -- where the aggregation simply involves summing values, as for a single industry index -- to the rather complicated technique for the industry sector, where value-added weights have been derived for the component industry groups from employment data.

The final level of aggregation involves the computation of a series of weights. These permit the aggregation of the sectors into GNP indexes, which then are used to move the base-year estimates (see under I, above).

In the present section the general methodology for the three levels of aggregation -- industry or industry group, sector, and GNP -- will be discussed in turn.

B. Industry or Industry Group Indexes.

The building block of the industry index is the production index for a commodity. The industry index consists of one or more production indexes. The production indexes measure changes in physical production of the subject commodities through time.

1. Prices Used.

Since it is not possible to aggregate physical units of different commodities, some common system of value must be used for weighting. A set of constant prices has been used in order to eliminate the impact of general price changes.

Use of constant money prices (in this case prices used for planning purposes) creates certain inaccuracies which should be understood by the reader. Maintenance of constant price relationships through time tends to eliminate the impact of technological change. Constant prices also tend to eliminate changes in the structure of demand for final goods. It should be noted, however, that sufficient changes to distort the index in any statistically significant sense occur at irregular intervals and usually develop gradually. Periodic revision of the price series through time will usually eliminate this problem. It is not believed that the impact of technological changes in the Satellite countries from 1938 to 1949 is such as to preclude the use of the planning prices for the Satellites (usually 1948-50 prices) as value weights.

Relatively complete lists of local planning prices are available in usable form only for Czechoslovakia, East Germany, and Hungary. Reflecting as they do the postwar and post-Communist scarcity relationships and the price basis used for current planning, these prices represent the best measure for recent years which is currently available. Hungarian prices have been used for the other Satellites (Poland, Rumania, and Bulgaria), on the grounds that the Hungarian product relationships would offer a closer approximation to these mixed agricultural and industrial economies than would the prices of highly industrialized Czechoslovakia and East Germany. (See Appendix B for a list of the prices used.)

2. Commodities Used.

No attempt has been made to cover exhaustively the commodities within each industry or industry group. It has been assumed that detailed reporting of the principal products for each industry yields a satisfactory level of accuracy, since a few key commodities usually constitute a preponderance of the value of output within an industry. (See Appendix B for a list of the commodities used.)

Development of production indexes by the procedure of analyzing commodity outputs appears to offer the firmest entry to the European Satellite economies currently available. The data published on national aggregates are fragmentary and cannot be interpreted with certainty. On the other hand, the physical output estimates used in this report rest on extensive data, which may be checked for internal consistency.

C. Sector Indexes.

For the purposes of this report, GNP is divided into the following income-originating sectors: industry, agriculture, transport and communications, construction, services, and trade. Discussion of the aggregation of indexes for these sectors follows.

1. Industry Sector Indexes.

a. Value-Added Concept.

The industry indexes, which are constructed with the use of price weights, measure changes in gross value of output. In a complex modern economy a substantial part of the gross value of output of each industry is produced by other industries from which materials and services are purchased: for example, gross value of output of the automobile industry includes some of the value of output produced by the steel industry. Overlapping relationships of this sort must be allowed for if an accurate measure of the contribution of the industry to the economy is to be computed. Since individual industries or industry groups contribute only a portion of the final value of industrial output, it is necessary to weight the industry indexes by the contributions each industry makes to the final industrial product. The latter concept is "value-added." This measure eliminates multiple counting in the development of the industry sector indexes.

Value added may be defined as a measure of the net addition to the value of the product contributed by a specific producing entity. The usual measure of value added is the sum of the wage bill, the capital consumption allowance, and the profits in the industry in question. Data in this detail have not been developed yet for the Satellite countries.

b. Estimation of Value-Added Weights for the Industry Sector.

The value-added weights employed herein are derived primarily from estimated industrial manpower allocations. Employment estimates by major industrial groups are available for the recent years 1952-53. Production data have been used to perform detailed breakdowns for the major industries. This technique permits the development of a series of value-added weights, which make possible in turn the development of a credible industry sector index.

Use of employment data involves the assumption that the productivity of labor in industrial employments is uniform. As a matter of practice, labor productivity increases as the concentration of capital per unit of labor increases. More than this, the technique more or less implicitly assumes that the labor cost imputed in the preceding manner constitutes the sole measure of value added. Thus there is the added implicit assumption that the covariation of depreciation (capital consumption allowances) and profits is identical with the variation in the labor force employed in the industry. The acceptability of employment data as a basis for computing for value-added weights is attested to by such independent checks as have become available thus far. The East German and Hungarian estimates of value added appear to coincide in general with the weights which have been developed from crude employment data. The present lack of information on wage payments, depreciation, and profits in the Satellites, however, would make it necessary to use the above technique even if it were less reliable than it appears to be. Appendix C summarizes the value-added weights derived for each European Satellite, and Appendix D explains the derivation of these weights.

c. Producer and Consumer Goods Subsector Weights.

The industry sector has been divided into two subsectors -- producer goods and consumer goods. Indexes of producer goods and consumer goods activity generally reflect fairly closely

the proclivity of the economy to spend for capital goods or for consumption. Allocations of industry weights to capital goods or consumption goods involves a certain amount of arbitrary judgment. The output of certain industry groups -- for example, chemicals, and solid fuels -- is purchased by industrial users and by consumers as final products, but these goods are purchased in such relatively small quantities by consumers as final products that quantification of this consumption has not been attempted, because the cost of developing accurate estimates would be excessive in comparison with the gain achieved.

The consumer goods index is built on a relatively small sample of output because of the limited reporting in this area. The producer goods subsector index probably is more representative of the change in production and capital goods industries, although the estimated margin of error for data on the producer goods area generally exceeds that for data on the consumer goods area. The grouping of the industry sector weights into consumer goods and producer goods subsectors for each European Satellite is shown in Appendix C.

d. Reliability of Industry Sector Index.

The reliability of the sector index is essentially a function of the reliability of its constituents. The principal constituents of the index are three: physical production reports for commodities and services, prices employed to value these commodities and services, and value-added weights developed to control multiple counting.

It is believed that the physical production estimates are broad enough in scope and sufficiently accurate to permit the development of a useful production index. In general, in industries or industry groups where the value-added weights are 5 or less there is a maximum margin of error of plus or minus 10 percent. In the highest value-added weight categories (10 and above), the margin of error usually lies within plus or minus 5 percent of the absolute production figure.*

* Many of the individual estimates upon which this report is based are believed to err only on the positive or on the negative side, but the margin of error expressed in the text, if accepted as an average of the individual estimates' margins of error, does not do violence to the facts. The estimates with these margins of error have a 95-percent confidence limit.

The price structure employed to value output is believed to be representative of scarcity relationships for the countries for which specific prices are available and reasonably reliable for the other countries, to which the Hungarian price structure is imputed.

Value-added weights seem to have a reasonable level of reliability. The weights seem to stand up well in terms of what information is available from East Germany, the only Satellite country for which an independent check is available. 1/*

The value-added weight employed herein for food was derived from the Soviet Bloc average, due note being taken of the net import status of the East German economy.

2. Other Sector Indexes.

The agricultural sector is simply a summation of the values of various agricultural products, in constant prices, and its formulation involves the computation of an index of production similar to the industry group indexes. The same is true of the transport and communications sector index. For the construction sector, also, a production index has been used, employing selected building materials. (The commodities, services, and prices used are shown in Appendix B.)

The services sector index is assumed to move in accordance with population changes. In the absence of specific data for services, it is assumed that per capita increases in government services, (health, education, and the like) roughly offset declines in the area of personal or private services in the Satellite countries.

The trade sector index has been obtained by means of employment in the retail and wholesale trade establishments. This technique has been checked against specific pronouncements about the share of trade in GNP in the early postwar period, during which time many of the European Satellites kept national accounts in a framework roughly comparable to that employed in this report.

* For serially numbered source references, see Appendix F.

D. GNP Indexes.

The GNP indexes, like the industry sector indexes, must measure the real change in production of all final goods and services over time. The sector weights therefore should represent gross value added by each sector.

The usual method of measuring real changes in GNP is to construct GNP in current prices for various years and to reduce the series to a constant price measure by the use of appropriate price indexes. This method requires reliable current value aggregates and comprehensive price information, both of which are unavailable for the European Satellites. In the absence of these, the method of aggregation of production information into GNP indexes has been used.

Value-added weights for sectors of GNP have been developed by various means. For Poland, Czechoslovakia, and Hungary, official published estimates have been adjusted to fit the classification of sectors used in this report. For East Germany, employment data have been used. For Rumania, sector weights have been developed by analogy with those for other Satellites. For Bulgaria, weights published by the UN have been used. The detailed calculations are presented in Appendix E.

E. Production and GNP Indexes.

The results of the above aggregation process are summarized in Tables 3-15.*

* Tables 3-15 follow on pp. 13 through 25.

Table 3

Sector and Gross National Product Indexes for Bulgaria
1938 and 1948-53

(1950 = 100)

	Value-Added Weights	1938	1948	1949	1950	1951	1952	1953
Gross national product		87	95	98	100	109	115	122
Industry	23.3	73	75	91	100	123	167	183
Producer goods	9.4	25	54	82	100	145	246	278
Consumer goods	13.9	106	89	96	100	108	113	118
Agriculture	44.4	99	104	101	100	106	96	100
Transport and communications	4.5	52	82	89	100	112	122	131
Construction	0.8	37	79	104	100	117	129	145
Services	14.3	89	97	98	100	100	101	103
Trade	12.7	84	100	100	100	100	100	100

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Table 4

Production Indexes for the Industry Sector in Bulgaria
1938 and 1948-53

(1950 = 100)

	Value-Added Weights	1938	1948	1949	1950	1951	1952	1953
Industry		73	75	91	100	123	167	183
Producer goods	38.9	25	54	82	100	145	246	278
Consumer goods	57.4	106	89	96	100	108	113	118
Total of weights	96.3							
Solid fuels	10.2	36	74	91	100	113	135	143
Ferrous metals	0.6	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Nonferrous metals	1.0	N.A.	N.A.	89	100	121	233	247
Shipbuilding	2.7	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Antifriction bearings	0.0							
Construction equipment	0.7	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Metalworking machinery	1.4	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Machine tools	0.2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Automotive equipment	1.0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Agricultural machinery	1.7	N.A.	6	40	100	214	414	456
Railroad equipment	2.2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Mining machinery	0.0							
Textile machinery	0.7	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Electrical equipment	2.5	N.A.	61	83	100	283	295	328
Military end items	3.0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Petroleum and petroleum products	0.0							
Light and textile	28.0	113	85	99	100	113	120	131
Chemicals and rubber	2.9	N.A.	48	72	100	123	693	987
Electric power	3.7	30	70	85	100	131	173	199
Food processing	24.6	111	96	95	100	102	103	99
Construction materials	2.8	45	95	117	100	115	118	136
Forest products	6.4	49	74	75	100	99	115	125
Total of weights	96.3							

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Table 5

Sector and Gross National Product Indexes for Czechoslovakia
1938 and 1948-53

(1950 = 100)

	Value-Added Weight	1938	1948	1949	1950	1951	1952	1953
Gross national product		92	89	96	100	102	105	106
Industry	40.8	69	85	96	100	106	112	115
Producer goods	27.0	55	85	90	100	109	117	124
Consumer goods	13.8	89	92	102	100	100	103	96
Agriculture	18.3	110	83	92	100	100	96	95
Transport and communications	8.1	65	99	94	100	105	112	121
Construction	4.8	102	62	93	100	103	106	107
Services	14.7	118	98	99	100	101	102	103
Trade	13.3	125	106	103	100	91	91	91

Table 6

Production Indexes for the Industry Sector in Czechoslovakia
1938 and 1948-53

(1950 = 100)

	Value-Added Weights	1938	1948	1949	1950	1951	1952	1953
Industry		69	85	96	100	106	112	115
Producer goods	62.5	55	85	90	100	109	117	124
Consumer goods	32.0	89	92	102	100	100	103	96
Total of weights	94.5							
Solid fuels	9.0	72	91	95	100	103	114	118
Ferrous metals	7.1	68	94	97	100	107	117	121
Nonferrous metals	1.2	65	111	94	100	111	111	121
Shipbuilding	0.6	79	92	96	100	100	106	110
Antifriction bearings	0.1	N.A.	30	59	100	135	180	220
Construction equipment	1.2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Metalworking machinery	2.7	45	85	94	100	106	113	123
Machine tools	2.9	44	81	96	100	104	111	122
Automotive equipment	3.2	40	86	96	100	114	116	125
Agricultural machinery	3.6	N.A.	79	91	100	121	140	151
Railroad equipment	4.2	N.A.	79	89	100	115	118	121
Mining machinery	1.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Textile machinery	1.6	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Electrical equipment	3.1	N.A.	77	92	100	109	121	133
Military end items	5.3	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Petroleum and petroleum products	0.3	3	86	94	100	112	126	145
Light and textile	19.8	85	105	112	100	101	99	99
Chemicals and rubber	5.2	74	75	88	100	111	120	126
Electric power	3.0	44	81	89	100	111	124	137
Food processing	8.5	99	77	83	100	94	108	81
Construction materials	3.9	80	9	90	100	112	121	130
Forest products	6.2	109	87	97	100	98	97	93
Total of weights	94.5							

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Table 7

Sector and Gross National Product Indexes for East Germany
1938 and 1948-53

(1950 = 100)

	Value-Added Weight	1938	1948	1949	1950	1951	1952	1953
Gross national product		152	81	88	100	113	124	132
Industry	43.1	185	64	79	100	125	149	166
Producer goods	28.7	201	61	77	100	126	158	180
Consumer goods	14.4	155	69	85	100	122	132	140
Agriculture	15.6	120	80	84	100	108	106	99
Transport and communications	6.1	162	65	85	100	111	123	135
Construction	5.3	146	78	80	100	108	114	137
Services	16.0	88	102	102	100	98	97	95
Trade	13.9	159	115	110	100	99	101	104

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Table 8

Production Indexes for the Industry Sector in East Germany
1938 and 1948-53

(1950 = 100)

	Value-Added Weights	1938	1948	1949	1950	1951	1952	1953
Industry		185	64	79	100	125	149	166
Producer goods	62.9	201	61	77	100	126	158	180
Consumer goods	31.7	155	69	85	100	122	132	140
Total of weights	94.6							
Solid fuels	7.4	81	74	81	100	110	115	122
Ferrous metals	8.0	169	39	63	100	116	190	229
Nonferrous metals	1.2	710	71	83	100	122	143	192
Shipbuilding	1.3	29	6	62	100	131	171	191
Antifriction bearings	0.1	N.A.	51	65	100	137	174	221
Construction equipment	1.1	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Metalworking machinery	1.3	332	74	87	100	113	132	150
Machine tools	1.8	262	58	69	100	119	135	152
Automotive equipment	4.8	N.A.	N.A.	N.A.	100	203	297	340
Agricultural machinery	1.8	308	54	77	100	115	138	154
Railroad equipment	3.4	N.A.	36	65	100	107	125	154
Mining machinery	1.7	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Textile machinery	0.9	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Electrical equipment	3.2	N.A.	56	78	100	124	147	169
Military end items	7.1	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Petroleum and petroleum products	1.2	N.A.	65	82	100	125	144	155
Light and textile	19.8	173	62	88	100	128	137	152
Chemicals and rubber	9.4	96	63	81	100	121	137	149
Electric power	2.7	95	81	92	100	113	124	135
Food processing	8.8	124	77	77	100	108	117	105
Construction materials	2.0	183	48	73	100	113	123	161
Forest products	5.6	104	126	95	100	100	97	98
Total of weights	94.6							

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Table 9

Sector and Gross National Product Indexes for Hungary
1938 and 1948-53

(1950 = 100)

	Value-Added Weight	1938	1948	1949	1950	1951	1952	1953
Gross national product		88	83	93	100	111	115	121
Industry	41.7	71	70	86	100	116	133	145
Producer goods	28.8	57	67	84	100	121	145	162
Consumer goods	12.9	93	78	90	100	105	109	111
Agriculture	25.2	108	93	101	100	112	94	95
Transport and communications	3.1	91	79	86	100	105	113	123
Construction	5.6	58	49	71	100	111	131	143
Services	15.2	99	99	100	100	101	102	102
Trade	9.2	114	106	103	100	101	101	101

Table 10

Production Indexes for the Industry Sector in Hungary
1938 and 1948-53

(1950 = 100)

	Value-Added Weights	1938	1948	1949	1950	1951	1952	1953
Industry		71	70	86	100	116	133	145
Producer goods	64.8	57	67	84	100	121	145	162
Consumer goods	29.0	93	78	90	100	105	109	111
Total of weights	93.8							
Solid fuels	9.7	73	77	97	100	114	138	156
Ferrous metals	10.5	68	99	95	100	101	113	119
Nonferrous metals	3.3	27	84	90	100	133	168	187
Shipbuilding	2.2	N.A.	N.A.	72	100	118	114	125
Antifriction bearings	0.0							
Construction equipment	0.0							
Metalworking machinery	1.1	N.A.	67	100	100	133	160	193
Machine tools	1.8	N.A.	46	77	100	146	185	223
Automotive equipment	7.0	45	24	72	100	166	203	207
Agricultural machinery	1.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Railroad equipment	2.6	N.A.	95	98	100	96	114	128
Mining machinery	3.4	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Textile machinery	1.0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Electrical equipment	4.3	N.A.	57	76	100	121	137	155
Military end items	3.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Petroleum and petroleum products	0.5	8	95	99	100	102	118	123
Light and textile	14.5	78	76	89	100	102	106	108
Chemicals and rubber	6.8	97	59	70	100	95	131	171
Electric power	2.1	50	72	85	100	119	151	180
Food processing	11.2	118	81	94	100	106	105	101
Construction materials	2.6	62	32	57	100	116	138	153
Forest products	3.6	119	104	100	100	100	96	95
Total of weights	93.8							

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Table 11

Sector and Gross National Product Indexes for Poland
1938 and 1948-53

(1950 = 100)

	Value-Added Weights	1938	1948	1949	1950	1951	1952	1953
Gross national product		106	85	92	100	101	103	107
Industry	29.4	80	77	88	100	105	115	123
Producer goods	18.7	69	78	88	100	107	123	137
Consumer goods	10.7	99	76	88	100	103	100	97
Agriculture	30.3	119	80	89	100	92	86	86
Transport and communications	5.6	79	78	91	100	118	132	145
Construction	3.0	114	87	96	100	114	118	131
Services	15.7	126	96	98	100	102	104	106
Trade	15.7	117	103	100	100	102	101	99

Table 12

Production Indexes for the Industry Sector in Poland
1938 and 1948-53

(1950 = 100)

	Value-Added Weights	1938	1948	1949	1950	1951	1952	1953
Industry		80	77	88	100	105	115	123
Producer goods	59.3	69	78	88	100	107	123	137
Consumer goods	34.0	99	76	88	100	103	100	97
Total of weights	93.3							
Solid fuels	13.7	89	91	95	100	105	110	116
Ferrous metals	6.8	62	73	84	100	104	117	124
Nonferrous metals	4.5	100	84	90	100	100	148	206
Shipbuilding	0.8	128	41	72	100	89	171	207
Antifriction bearings	0.1	N.A.	N.A.	N.A.	100	250	400	550
Construction equipment	1.7	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Metalworking machinery	1.1	31	92	100	100	108	108	100
Machine tools	0.5	22	61	87	100	109	120	117
Automotive equipment	0.3	51	24	55	100	139	291	415
Agricultural machinery	2.0	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Railroad equipment	3.8	10	91	86	100	101	107	107
Mining machinery	2.2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Textile machinery	1.2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Electrical equipment	2.3	N.A.	37	83	100	113	137	159
Military end items	4.5	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Petroleum and petroleum products	1.1	41	80	88	100	122	136	157
Light and textile	20.4	85	79	94	100	104	104	103
Chemicals and rubber	3.7	52	78	87	100	109	118	132
Electric power	3.2	74	80	87	100	118	135	152
Food processing	10.2	113	70	76	100	98	85	75
Construction materials	3.7	118	69	89	100	118	131	150
Forest products	5.5	194	88	94	100	104	104	101
Total of weights	93.3							

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Table 13

Sector and Gross National Product Indexes for Rumania
1938 and 1948-53

(1950 = 100)

	Value-Added Weight	1938	1948	1949	1950	1951	1952	1953
Gross national product		115	95	96	100	110	107	112
Industry	26.4	107	81	89	100	114	127	139
Producer goods	15.4	99	79	89	100	117	134	152
Consumer goods	11.0	117	83	90	100	109	118	120
Agriculture	37.4	126	104	98	100	114	95	96
Transport and communications	5.0	98	67	87	100	112	124	137
Construction	1.9	141	76	79	100	126	164	189
Services	15.0	97	98	99	100	101	102	104
Trade	14.2	120	110	105	100	100	93	91

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Table 14

Production Indexes for the Industry Sector in Rumania
1938 and 1948-53

(1950 = 100)

	Value-Added Weights	1938	1948	1949	1950	1951	1952	1953
Industry		107	81	89	100	114	127	139
Producer goods	56.1	99	79	89	100	117	134	152
Consumer goods	39.9	117	83	90	100	109	118	120
Total of weights	96.0							
Solid fuels	6.5	82	88	92	100	120	134	197
Ferrous metals	16.3	98	82	91	100	110	121	134
Nonferrous metals	0.2	123	100	100	100	115	143	131
Shipbuilding	2.3	N.A.	111	86	100	114	N.A.	N.A.
Antifriction bearings	0.1	N.A.	N.A.	4	100	150	200	250
Construction equipment	0.0							
Metalworking machinery	0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Machine tools	0.2	N.A.	N.A.	N.A.	N.A.	100	150	200
Automotive equipment	2.1	N.A.	24	61	100	127	136	121
Agricultural machinery	1.5	N.A.	33	64	100	140	177	214
Railroad equipment	1.8	N.A.	90	96	100	119	131	144
Mining machinery	0.0							
Textile machinery	0.3	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Electrical equipment	1.6	N.A.	50	76	100	118	138	153
Military end items	3.6	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Petroleum and petroleum products	6.6	120	86	91	100	132	140	153
Light and textile	19.6	119	73	82	100	114	126	136
Chemicals and rubber	3.9	79	79	91	100	108	170	181
Electric power	2.7	53	69	88	100	117	134	157
Food processing	16.3	116	93	96	100	102	107	98
Construction materials	2.7	69	70	81	100	132	177	203
Forest products	6.9	150	104	110	100	102	99	101
Total of weights	96.0							

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Table 15

Sector and Gross National Product Indexes for the European Satellites
1938 and 1948-53

(1950 = 100)

	1938	1948	1949	1950	1951	1952	1953
Gross national product	115	86	92	100	106	110	116
Industry	110	76	88	100	114	128	137
Producer goods	108	73	84	100	116	137	153
Consumer goods	113	78	91	100	109	113	113
Agriculture	118	85	90	100	102	95	93
Transport and communications	100	80	90	100	111	123	134
Construction	118	74	87	100	109	116	131
Services	109	98	100	100	100	101	102
Trade	129	107	104	100	99	99	98

APPENDIX A

DEVELOPMENT OF BASE-YEAR GNP ESTIMATES, BY COUNTRY

Summarized below are the detailed calculations made to obtain base-year GNP estimates in dollars and local currency. It will be noted that the methodology follows the course of taking a published aggregate for a prewar year -- usually an estimate by Colin Clark or by the UN -- and adjusting it to conform with the US concept of GNP. Estimates have been adjusted where necessary (especially for capital consumption) by analogy with US experience. It is recognized that the European Satellite economies are hardly comparable to the US economy and that this procedure introduces some error into the final result.

In general, the base-year estimates as they stand are subject to correction, and further study of the base-year data probably will result in changes in the case of some countries. The estimate of the GNP for the European Satellites as a whole, however, is not likely to change significantly as a result of further study of the base-year data.

The following relationships are used throughout this appendix:

Net material product plus adjustment for omitted services equals net national product (NNP) at factor cost.

NNP at factor cost equals national income (NI).

NNP at factor cost plus an adjustment to allow for indirect taxes plus profits of government-owned enterprises minus subsidies equals NNP at market prices.

NNP at market prices plus capital consumption allowance (the amount of investment necessary to keep capital intact) equals gross national product (GNP) at market prices.

One I.U. (International Unit) equals one 1925-34 US dollar (quantity of commodities exchangeable for $1 in the US over the average period 1925-34). 2/

Factors for converting estimates in I.U.'s and 1938 US dollars to 1951 US dollars are based on US retail price indexes, as follows: a factor of 1.864 has been used to convert I.U.'s (1925-34 average prices) and a factor of 2.06 to convert 1938 dollars.

1. Bulgaria.

The base-year estimates of GNP for Bulgaria, together with population data, are presented in Table 16, both for the prewar territory of Bulgaria and as adjusted for territorial changes resulting from World War II. The methods of derivation are explained below.

Table 16

Gross National Product and Population Data for Bulgaria
1938

	Gross National Product		
	(Billion 1938 Leva) a/	(Billion 1951 $)	Population (Million)
Prewar territory	58.8	0.96	6.2
Postwar territory	62.9	1.03	6.6

a. Factor cost.

a. Local Currency Estimate.

The territorially unadjusted local currency estimate of the GNP of Bulgaria in 1938 -- 58.8 billion leva (at factor cost) -- is based on a UN estimate of 55.5 billion leva for NNP at factor cost in 1938. 3/ This estimate has been converted to GNP at factor cost by assuming the same rate of capital consumption attributed to Hungary and Rumania (6 percent of NNP at factor cost). Thus 55.5 billion leva x 1.06 = 58.8 billion leva (1938 GNP at factor cost, territorially unadjusted). Information is not available to convert this estimate to a market price basis.

b. Dollar Estimate.

The territorially unadjusted dollar estimate ($0.96 billion) is based on the 55.5-billion-leva estimate used above, which has been converted into dollars at an adjusted leva-dollar exchange rate in 1938. This rate was derived by adjusting the 1939 exchange value implicit in Clark's calculations (145 leva = $1) 4/ by indexes of wholesale prices for the US and Bulgaria between 1938 and 1939. The result was a rate for 1938 of 149 leva = $1. Employing this ratio, 55.5 billion leva ÷ 149 = $373 million (NNP at factor cost, 1938 prices). $373 million x 2.06 = $768 million (NNP at factor cost, 1951 prices). Computation of the 1938 Bulgarian GNP from these data was accomplished by the use of the ratio of NNP (at factor cost) to GNP (at market prices) which obtained for the US, which was 25.5 percent. Thus $768 million x 1.255 = $0.96 billion (1938 GNP, 1951 prices, territorially unadjusted).

c. Adjustment for Postwar Territorial Changes.

The adjustment for postwar territorial changes ($0.07 billion) reflects the addition of Southern Dobruja. The computation of the addition for Southern Dobruja is described in 6, c, below, which deals with Rumania. The Bulgarian GNP estimate in 1951 dollars for 1938 thus becomes $0.96 billion + $0.07 billion = $1.03 billion (7 percent higher than the territorially unadjusted estimate). On the same basis, the local currency estimate becomes 58.8 billion leva x 1.07 = 62.9 billion leva (GNP at factor cost).

2. Czechoslovakia.

The base-year estimates of GNP for Czechoslovakia, together with population data, are presented in Table 17,* both for the prewar territories of Czechoslovakia and as adjusted for territorial changes resulting from World War II. The methods of derivation are explained below.

a. Local Currency Estimate.

The GNP estimate of 69.6 billion 1938 koruna has been developed from Milos Stadnik's estimate of NNP for Czechoslovakia in 1938 at factor cost, 56.7 billion koruna. 5/ An upward adjustment

* Table 17 follows on p. 30.

Table 17

Gross National Product and Population Data for Czechoslovakia
1938

	Gross National Product		
	(Billion 1938 Koruna)	(Billion 1951 $)	Population (Million)
Prewar territory	69.6	7.7	15.4
Postwar territory	65.5	7.3	14.6

of 10 percent has been made to allow for indirect taxes. This percentage is based on proportions implicit in Clark's calculations for the year 1937. 6/ Thus 56.7 billion x 1.10 = 62.4 billion koruna (1938 NNP at 1938 market prices).

NNP at market prices has been adjusted by the allowance of 11.5 percent for depreciation to yield GNP at market prices. This allowance is based on the allowance for depreciation in prewar Poland, which is 10 percent. This figure has been adjusted to apply to Czechoslovakia by multiplying by $\frac{1.644}{1.434} = 1.115$, which represents the following: $\frac{\text{ratio of Polish to Czechoslovak NNP at market prices}}{\text{ratio of Polish to Czechoslovak stocks of capital goods}}$

Thus 62.4 billion koruna x 1.115 = 69.6 billion koruna (1938 GNP at 1938 market prices). 7/

b. Dollar Estimate.

The dollar estimate also has been derived from Stadnik's 1938 estimate for NNP at factor cost (56.7 billion koruna), 8/ as adjusted by Clark's allowance of 10 percent for indirect taxes. This sum (62.4 billion koruna) has been revalued to 1929 prices. The following procedure has been used: Clark estimated that the general level of prices in 1937 stood at 94.4 (1929 = 100). 9/ The general price level rose in 1938 to 105 (1937 = 100). 10/ Thus in 1938 the price level may be indicated as follows: 94.4 x 1.05 = 99.1 (1929 = 100), and 62.4 billion koruna ÷ 0.991 = 63 billion koruna (NNP for Czechoslovakia in 1938, 1929 market prices).

This sum has been converted to I.U. by means of Clark's data, which indicated that 1 koruna in 1929 = 0.0602 I.U., or 16.6 koruna = 1 I.U. The conversion of the Czechoslovak NNP to I.U. may then be expressed as follows: $\frac{63.0}{16.6}$ = 3.8 billion I.U. (1938 NNP). Revalued to 1951 prices, 3.8 billion I.U. x 1.864 = $7.08 billion. An adjustment for capital consumption of 9.3 percent (based on the ratio of GNP to NNP in the US for 1929) then has been made. Thus $7.08 billion x 1.093 = $7.74 billion (GNP for Czechoslovakia in 1938, 1951 prices, prewar territory).

c. Adjustment for Postwar Territorial Changes.

The only territorial adjustment required for Czechoslovakia is to subtract Sub-Carpathian Ruthenia (not incorporated into the Ukrainian SSR) from the totals for Czechoslovakia. Sub-Carpathian Ruthenia had a prewar population of some 0.8 million. 11/ Assuming an average gross product per capita of about $540 (the unadjusted average for prewar Czechoslovakia), the total product of the area is estimated at $0.43 billion. Thus the adjusted GNP estimates may be expressed as follows: $7.74 - $0.43 billion = $7.3 billion (the 1938 GNP for Czechoslovakia, 1951 prices, postwar territory). The adjusted product is 94.3 percent of the previous total. The local currency estimate then may be expressed as follows: 69.5 billion koruna x 0.943 = 65.5 billion koruna (1938 GNP for Czechoslovakia, 1938 prices, postwar territory).

3. East Germany.

The base-year estimates of GNP for East Germany, together with population data, are presented in Table 18.* The methods of derivation are explained below.

a. Local Currency Estimate.

The local currency estimate for GNP at market prices for East Germany in 1938 is based on the work of Colin Clark, who in turn derived his estimate from the thorough study of the US Strategic Bombing Survey (USSBS).** 12/

* Table 18 follows on p. 32.

** The USSBS work also has been used by Professor A.J. Brown of Oxford in his studies on German rearmament. It is the opinion of Brown that corrected Statistisches Reichsamt estimates agree fairly well with USSBS data adjusted to a factor cost basis.

Table 18

Gross National Product and Population Data for East Germany
1938

	Gross National Product		
	(Billion 1938 RM)	(Billion 1951 $)	Population (Million)
East Germany including East Berlin	25.0	16.1	16.6 a/

a. 13/

The USSBS estimate, which is considered the best estimate of the GNP for greater Germany in 1938, is 112 billion Reichsmark (RM) (after deducting interest payments on the national debt). The studies of Clark and Dr. Ferdinand Grunig have been used to calculate the portion contributed by East Germany. Clark estimated that 10.66 percent of the GNP of greater Germany (in 1936 and 1937) must be deducted in order to exclude the contributions of Austria, the Sudetenland, and Memel, leaving 89.34 percent for prewar Germany (including East Prussia) plus the Polish-occupied territories. 14/ Grunig estimated that 88.4 percent of the GNP of this area represented the GNP of the area constituting postwar East and West Germany, of which East Germany (including East Berlin) contributed 28.4 percent.* 15/ Thus RM 112 billion x 0.8934 x 0.884 x 0.284 = RM 25 billion (1938 GNP of East Germany, including East Berlin, 1938 prices).

b. Dollar Estimate.

The East German dollar estimate ($16.1 billion, 1951 prices) also is based on USSBS data, as converted by Clark, who applied purchasing power parities to the local currency figures for various sectors. Clark's basic estimate for 1938 (35.2 billion I.U.) represents NNP at market prices for greater Germany (excluding an

* Professor A.J. Brown uses approximately the same factor.

allowance for the retail valuation of farm consumption, as in the case of Poland). 16/ This figure has been converted to 1951 dollars as follows: 35.2 billion I.U. x 1.864 = $65.6 billion (NNP for prewar Germany, 1951 market prices). Using Grunig's percentages, the contribution of East Germany is computed as follows: $65.6 billion x 0.8934 = $58.6 billion. $58.6 x 0.884 x 0.284 = $14.7 billion (1938 NNP of East Germany, 1951 market prices). NNP is converted to GNP by applying a fixed capital consumption allowance of 9.8 percent.* Thus $14.7 billion x 1.098 = $16.1 billion 17/ (1938 GNP for East Germany, including East Berlin, 1951 prices).

c. Adjustment for Postwar Territorial Changes.

The adjustments for territorial changes used above were developed originally for slightly different purposes. Clark's allowance for Austria, the Sudetenland, and Memel (10.66 percent of the total for greater Germany) reflected data for 1936 and 1937 and was applied to his figure for NNP at market prices in 1938. Grunig's breakdown of the GNP of the area of postwar East and West Germany plus East Prussia and the Polish-occupied territories applied to German NI (with a slightly different concept) in 1936. The combined use of these factors to obtain both a local currency estimate and a dollar estimate is believed, however, to give a somewhat better result than the application of simple per capita figures (though the difference is small).

Grunig's percentages have been used also to break out the contribution of East Prussia and the Polish-occupied territories (see under 5, c, below, where these are taken up in connection with the GNP of Poland).

The contributions of East Prussia and the Polish-occupied territories to the GNP for prewar Germany, based on Grunig's figure, are 1.7 percent and 9.9 percent, respectively (or, together, 11.6 percent). These percentages, applied to the NNP of prewar Germany, result as follows: $58.6 billion x 0.017 = $0.97 (East Prussia), and $58.6 x 0.099 = $5.83 (Polish-occupied territories), a total figure of $6.8 billion. By applying the same capital consumption allowance (9.8 percent) to convert to GNP, the results are as follows: $0.97 billion x 1.098 = $1.06 billion (East Prussia); $5.83 bil-

* An average of the capital consumption for the US in 1929 and 1938.

lion x 1.098 = $6.38 billion (Polish-occupied territories); and $6.8 billion x 1.098 = $7.44 billion (total GNP for both territories).

4. Hungary.

The base-year estimates of GNP for Hungary, together with population data, are presented in Table 19.

Table 19

Gross National Product
and Population Data for Hungary a/
1938

Gross National Product		
(Billion 1938 Pengoes)	(Billion 1951 $)	Population (Million)
6.62	2.45	9.2

a. There were no significant territorial changes in Hungary as a result of World War II.

a. Local Currency Estimate.

The local currency estimate of the GNP of Hungary for 1938 -- 6.62 billion pengoes, 1938 prices -- has been obtained by manipulation of Clark's estimate of the NNP at market prices in 1938/39, 6.44 billion pengoes. To raise NNP to GNP, the following calculations have been made.

The UN estimated that the increment necessary to raise NNP to GNP was 6 percent of the NNP at factor cost. The 6-percent factor was applied to the UN estimate of the NNP (4.94 billion pengoes). 18/ 4.94 billion pengoes x 0.06 = 0.3 billion pengoes for capital consumption. Clark's estimate of 6.44 billion pengoes was derived from an estimate of 5.19 billion pengoes at factor cost, which excluded public services and indirect taxes. 19/ If the capital consumption

adjustment (0.3 billion pengoes) is applied to 5.19 billion pengoes (NNP at factor cost), the application of this figure to Clark's estimate gives a result as follows: the rate of capital consumption becomes 0.3 billion ÷ 5.19 billion, or 5.78 percent. 6.44 billion pengoes x 1.0578 = 6.81 billion pengoes (GNP for Hungary, 1938/39). This estimate has been deflated to a 1938 base by using Clark's studies of income for the period July 1937 to July 1939. During this period real income rose about 11.5 percent, 20/ or about 5.6 percent per year (compounded). The dollar estimate for 1938/39 has been converted to 1938 by a rough 6 months' average rate (2.8 percent). Thus 6.82 billion pengoes ÷ 1.028 = 6.62 billion 1938 pengoes (1938 GNP at market prices).

b. Dollar Estimate.

The estimate of the GNP of Hungary in 1938 -- $2.45 billion, 1951 US prices -- also has been constructed from Clark's estimate of 6.44 billion pengoes for the 1938/39 Hungarian NNP at current market prices. 21/ The Clark estimate includes an adjustment to cover certain income from services, obtained by reference to Hungarian national income data. Clark's adjustments involving the balance of payments have been omitted because the original data appeared to include net income from abroad. The estimate has been converted to 1929 prices by using the index of general price change in Hungary implicit in Clark's figures; namely, 1938/39 = 87.5 (1929 = 100). The conversion to 1929 prices is as follows: 6.44 billion pengoes ÷ 87.5 = 7.36 billion pengoes (NNP for 1938/39, at 1929 market prices). This result has been converted to I.U.'s at the rate indicated by Clark, that is, 5.914 pengoes = 1 I.U. 22/ Thus 7.36 billion pengoes ÷ 5.914 = 1.24 billion I.U. The I.U. estimate has been converted to 1951 prices as follows: 1.24 billion I.U. x 1.864 = $2.31 billion (Hungarian NNP at market prices in 1938/39, 1951 prices). NNP has been adjusted for capital consumption at the rate of 9.3 percent of NNP, the rate obtained when a 1929 rate of exchange is involved in establishing the value of national currency in terms of I.U. The adjustment for capital consumption allowances may be expressed as follows: $2.31 billion x 1.093 = $2.52 billion, Hungarian GNP in 1938/39, 1951 US prices. This figure is deflated to a 1938 base by using the same adjustment as for the local currency estimate above. Thus $2.52 billion ÷ 1.028 = $2.45 billion (1938 GNP, 1951 prices).

5. Poland.

The base-year estimates of GNP for Poland, together with population data, are presented in Table 20, both for the prewar territory of Poland and as adjusted for territorial changes resulting from World War II. The methods of derivation are explained below.

Table 20

Gross National Product and Population Data for Poland
1938

	Gross National Product		
	(Billion 1938 Zloty)	(Billion 1951 $)	Population (Million)
Prewar territory	23.0	12.5	34.7 a/
Postwar territory	26.7	14.5	31.2 b/

a. 23/
b. This figure is derived by adding to 34.7 million, 8.6 million from territories added to Poland after the war, and subtracting from the resultant sum, 12.13 million from territories lost by Poland after the war. 24/ The estimate of 8.6 million does not include East Prussia.

a. Local Currency Estimate.

The GNP estimate of 23 billion zloty for 1938 rests on the UN estimate of 19.8 billion zloty of NNP at factor cost, adjusted for international comparability. 25/ In order to achieve a market price estimate, the UN estimate has been adjusted by a net increase of 5 percent, to reflect the impact of indirect taxes (plus profits of government-owned enterprises minus subsidies). 26/ Thus 19.8 billion zloty x 1.05 = 20.8 billion zloty (NNP at market prices). NNP at market prices in turn has been adjusted for an estimated 2.2 billion zloty allocated to capital consumption in order to arrive at GNP at market prices. The estimate of 2.2 billion zloty represents

an average of ratios of GNP at market prices based on official figures 27/ and of NNP at market prices, as estimated by the University of Birmingham, 28/ for the years 1929 and 1933. Finally, 20.8 billion zloty + 2.2 billion zloty = 23 billion zloty (GNP at market prices).

b. Dollar Estimate.

The dollar estimate for the GNP of Poland in 1938 -- $12.5 billion, 1951 prices, prewar territory -- is the result of applying a series of adjustments to an estimate of NNP by Clark. Clark's basic estimate of NNP is 5.59 billion I.U. for 1938. Subtracting 0.57 billion I.U., which represents the imputed write-up to retail prices of the value of home-produced goods consumed on farms, 29/ leaves 5.02 billion I.U.

Clark's analysis also must be adjusted for "omitted services," since it is based on the official estimate for 1938 and thus is fundamentally a "net material product" estimate. The mean of two estimates was used in conversion from the Soviet GNP concept to the US concept. One estimate is based on the UN data, which imply an increase of 27 percent over the Soviet concept. 30/ The other, developed by Bergson in the construction of similar calculations for the USSR for 1937, 31/ indicates an increase of 18 percent. The mean of these two estimates is calculated as follows: 5.02 billion I.U. x 1.18 = 5.92 billion I.U., and 5.02 billion I.U. x 1.27 = 6.38 billion I.U. These estimates are converted to US 1951 prices as follows: 5.92 billion I.U. x 1.864 = $11 billion, and 6.38 billion I.U. x 1.864 = $11.9 billion. The simple mean of these estimates is $11.4 billion (a measure of the NNP of Poland in 1938, 1951 market prices). The NNP has been expanded to cover the capital consumption allowance estimated at 9.8 percent of NNP. Thus, $11.4 billion x 1.098 = $12.5 billion (GNP in 1938, territorially unadjusted).

c. Adjustment for Postwar Territorial Changes.

The GNP estimates for 1938 -- $12.5 billion and 23 billion zloty -- represent GNP for the prewar territory of Poland. This territory was altered radically in the course of the provisional boundary settlements at Yalta. Two steps are required to adjust the prewar GNP to reflect these territorial changes.

The first step is to adjust for the territory acquired by Poland from Germany. This adjustment has been made on the basis of figures developed in 3, c, above, in connection with the GNP of East Germany. Prewar Germany lost $7.44 billion as a result of the loss of the Polish-occupied territories plus East Prussia. Since the economically most significant part of the latter was ceded to the USSR, GNP generated therein, $1.06 billion, was subtracted from $7.44 billion. Thus $7.44 billion - $1.06 billion = $6.4 billion (net gain in Polish GNP).

The second step is to adjust for the territory lost by Poland to the USSR. Average per capita gross product estimates based upon prewar per capita production generated in this area have been multiplied by the 1938 population of this area to approximate the loss in GNP resulting from the boundary changes. A prewar population of 12.13 million was estimated for the area which Poland lost to the USSR. 32/ This population, multiplied by an average per capita product for Poland (prewar territory), $360 per capita, indicates a loss of territory producing about $4.4 billion. The net result of these gains and losses -- $6.4 billion minus $4.4 billion -- is a net gain of $2 billion. The addition of this amount to the previous GNP estimate of $12.5 billion yields a 1938 territorially adjusted estimate of $14.5 billion.

Upward adjustment accounted for by territorial change is thus about 16 percent of the unadjusted total. The local currency estimate is increased by the same proportion, as follows: 23 billion zloty x 1.16 = 26.7 billion zloty, to obtain the territorially adjusted estimate in 1938 Polish currency.

6. Rumania.

The base-year estimates of GNP for Rumania, together with population data, are presented in Table 21,* both for the prewar territory of Rumania and as adjusted for territorial changes resulting from World War II. The methods of derivation are explained below.

a. Local Currency Estimate.

The territorially unadjusted local currency estimate of the GNP of Rumania in 1938 -- 276 billion lei, 1929 prices -- is obtained

* Table 21 follows on p. 39.

Table 21

Gross National Product and Population Data for Rumania
1938

	Gross National Product		
	(Billion 1929 Lei)	(Billion 1951 $)	Population (Million)
Prewar territory	276.0	3.77	20.0
Postwar territory	224.0	3.07	15.9

by using Clark's procedures, which have been applied to a 1929 estimate of Rumanian national income at factor cost, 195.9 billion lei. (Clark used almost the same figure -- 201 billion lei.) 33/ This estimate was then adjusted in the same proportion in which Clark adjusted his figures for 1929. This manipulation yields 232.5 billion lei as the 1929 NNP, at 1929 market prices. To get an estimate of NNP at market prices in 1938, the population ratio of the respective years has been applied to the 1929 NNP. Thus 232.5 billion lei x 1.119 percent = 260 billion lei (NNP at prices in 1938, 1929 market prices). This sum has been adjusted to a GNP basis by assuming the rate of capital consumption previously applied to Hungary, 6 percent of NNP at factor cost. The result attained in this fashion is 276 billion lei, the Rumanian GNP in 1938, 1929 prices, territorially unadjusted. (See Table 21, above, for summary of estimates.)

b. Dollar Estimate.

The territorially unadjusted dollar estimate for 1938 of $3.77 billion was derived from the 1929 estimate of 232.5 billion lei for NNP at market prices, indicated in the local currency estimate above. This estimate has been converted to 1.64 billion I.U., 34/ which is converted to 1951 dollars as follows: 1.64 billion I.U. x 1.864 = $3.06 billion (NNP at market prices in 1929, 1951 prices). The 1929 population figure is given by Clark as 17.6 million. 35/ The per capita 1929 figure is thus taken to be about $174. The total population in 1938 was 19.8 million. 36/ The 1929 per capita estimate is multiplied by the 1938 total population

figure as follows: $174 x 19.8 million = $3.45 billion (NNP in 1938, 1951 market prices). By applying the US capital consumption allowance for 1929, 9.3 percent, GNP would be $3.45 billion x 1.093 = $3.77 billion.

c. Adjustment for Postwar Territorial Changes.

Between 1938 and 1946, Bessarabia and Northern Bukovina, with a total prewar population of 3.7 million, were ceded to the USSR, 37/ and Southern Dobruja with a prewar population of 0.4 million was ceded to Bulgaria. Thus Rumania sustained a net loss of 4.1 million of 1938 population. At an average gross per capita product of $170, the adjustment required would be the following: $170 x 3.7 million = 0.63 billion for the area ceded to the USSR, and $170 x 0.4 million = $0.7 billion for the area ceded to Bulgaria. The total adjustment to the Rumanian GNP of $3.77 billion, calculated above, is $0.74 billion, leaving $3.07 billion as the territorially adjusted Rumanian GNP for 1938, about 81.4 percent of the unadjusted amount. Applying the same factor to the local currency estimate results as follows: 275.6 billion lei x 0.814 = 224 billion lei, 1929 prices, the territorially adjusted local currency estimate of the GNP of Rumania in 1938.

APPENDIX B

PRICES USED AS WEIGHTS IN COMPUTATION OF PRODUCTION INDEXES a/*

Table 22

Index	Commodity	Unit	Czechoslovakia Price (Koruna)		East Germany Price (Deutschemark East)		Hungary Price (Forints)	
Industry Sector								
Solid fuels	Hard coal	Metric tons	330	b/	27	b/	144.10	b/
	Lignite and brown coal	Metric tons	205	b/	3.17	b/	92.45	c/
	Manufactured gas (coal)	Thousand cubic meters	1,000	b/	140	b/	420	b/
Ferrous metals	Pig iron	Metric tons	2,400	b/	85	c/	550	b/
	Finished steel	Metric tons	17,519	c/	194	c/	2,712	c/
Nonferrous metals	Antimony	Metric tons	75,276	d/	4,590	d/	28,000	d/
	Mercury	Metric tons	393,600	d/				
	Refined lead	Metric tons	52,480	d/	320	b/	1,966	d/
	Aluminum ingot	Metric tons	20,828	d/	1,270	b/	7,800	b/
	Secondary copper	Metric tons	13,120	d/	800	b/		
	Primary copper	Metric tons			1,350	b/		
	Fluorspar	Metric tons			140	d/		
	Tin	Metric tons			25,000	b/		
	Bauxite	Metric tons					62.91	b/
Shipbuilding	Merchant ships							
	Under 1,000 gross register tons		9,000	d/	2,753	c/	10,800	c/
	Over 1,000 gross register tons						10,800	c/
	Dumb barges, non-self-propelled						6,800	c/
	Marine engines							
	Under 750 horsepower	Horsepower	2,500	d/			3,002	d/
	Over 750 horsepower	Horsepower	2,500	d/			3,002	d/
Antifriction bearings		Million bearings	e/		e/		e/	
Metalworking machinery	Machines	Each	e/		e/		e/	
Machine tools	Machines	Each	e/		e/		e/	
Automotive equipment	Trucks	Each	221,000	c/	7,510	c/	75,500	c/
	Passenger cars	Each	102,200	c/	5,300	c/	53,282	a/
	Tractors	Each	150,190	c/	9,570	c/	67,000	c/
Agricultural machinery	Tractor-plows	Each			460	b/	410	b/
	Tractor-drills	Each					2,700	b/
	Tractor reaper binders	Each	26,515	b/			18,000	b/
	Threshing machines	Each					27,180	a/

* Footnotes for Table 22 follow on p.

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Table 22
(Continued)

Index	Commodity	Unit	Czechoslovakia Price (Koruna)		East Germany Price (Deutschemark East)		Hungary Price (Forints)	
Industry Sector Continued								
Railroad equipment	Steam locomotives	Each	5,685,600	d/				
	Electric locomotives	Each	13,132,500	d/				
	Freight cars (2-axle unit)	(2-axle unit)			12,500	b/		
	Freight cars	Each	309,000	d/			100,000	b/
	Railroad passenger cars	Each	3,677,100	d/	100,000	b/	1,190,000	b/
Electrical equipment			f/		f/		f/	
Petroleum and petroleum products	Crude petroleum	Metric tons	2,300	b/	e/		174.23	b/
	Synthetic petroleum	Metric tons	4,100	d/			1,350.00	d/
	Natural gas (dry)	Thousand cubic meters	1,000	b/			60.50	b/
Light and textile	Cotton yarn	Metric tons	97,000	b/	2,850	b/	24,100	b/
	Wool yarn	Metric tons	206,000	b/	6,700	b/	68,879	b/
	Synthetic rayon	Metric tons	90,000	b/	4,150	b/	77,348	b/
	Boots and shoes	Pairs	185	c/	11.08	c/	72.88	c/
Chemicals and rubber	Rubber tires	Each	1,413	c/	216.43	d/	1,008.60	c/
	Reclaimed rubber	Metric tons	11,480	d/	700	b/	8,861.66	d/
	Sulfuric acid	Metric tons	2,150	b/	77.50	b/	1,661.33	b/
	Nitric acid	Metric tons	7,850	b/	280	b/	7,578.55	b/
	Synthetic ammonia	Metric tons	14,000	b/	420	b/	7,752.64	b/
	Caustic soda	Metric tons	7,900	b/	217	d/	4,615.91	b/
	Chlorine	Metric tons	6,300	b/	550	b/	4,867.97	d/
	Calcium carbide	Metric tons	5,888	d/	210	b/	5,683.91	d/
	Refined benzol	Metric tons	7,000	b/	550	b/	5,403.45	d/
	Toluol	Metric tons	12,100	b/	600	b/	9,347.97	d/
	Refined phenol	Metric tons	23,000	b/	90	b/	17,831.39	d/
	Cresol	Metric tons	20,000	b/	680	b/	15,670.01	d/
	Xylol	Metric tons	11,600	b/	913	d/	8,969.73	d/
	Naphthalene	Metric tons	2,000	b/	200	b/	1,543.84	d/
	Synthetic rubber	Metric tons	40,984	d/	2,500	b/	31,636.13	d/
Electric power		Billion kilowatt-hours	e/		e/		e/	
Food processing industry	Animal fats	Metric tons	35,200	b/	1,900	b/	16,660	b/
	Vegetable oil	Metric tons	30,600	c/	1,440	b/	8,703	c/
	Sugar	Metric tons	5,980	b/	430	b/	5,025	b/
	Meat	Metric tons	37,600	c/	1,400	c/	11,945	c/
	Flour	Metric tons	3,930	b/	295.50	c/	1,260.70	b/

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Table 22
(Continued)

Index	Commodity	Unit	Czechoslovakia Price (Koruna)		East Germany Price (Deutschemark East)		Hungary Price (Forints)	
Industry Sector Continued								
Construction materials	Cement	Metric tons	530	b/	37	b/	205.23	b/
	Bricks	Thousands	1,150	d/	35.20	b/	186.14	b/
Forest products	Fuelwood	Cubic meters	290	b/	6	b/	93.90	d/
	Industrial wood	Cubic meters	458	d/	9.48	d/	148.20	d/
Transport and communications Sector								
Transportation	Rail transport	Ton-kilometers	0.0488	g/	0.0488	g/	0.0488	g/
	Inland water transport	Ton-kilometers	0.0400	g/	0.0400	g/	0.0400	g/
	Oceanic transport	Ton-kilometers	0.0243	g/	0.0243	g/	0.0243	g/
	Road transport	Ton-kilometers	0.0780	g/	0.0780	g/	0.0780	g/
Communications	Long-distance telephone conversations		26	d/	3	d/	7.0	d/
	Telegrams		17	d/	2	d/	5	d/
Agriculture Sector								
Industrial crops	Cotton, ginned	Metric tons	40,005	d/	3,330	b/	6,600	b/
	Wool, grease basis	Metric tons	66,808	d/	2,800	b/	11,000	b/
	Hemp	Metric tons	44,806	d/	4,810	b/	7,392	b/
	Flax, scutched basis	Metric tons	74,009	d/	5,000	b/	12,185	b/
	Sugar beets	Metric tons	600	b/	37.20	d/	201	d/
Food crops and livestock	Bread grains	Metric tons	4,000	b/	197	b/	778	b/
	Coarse grains	Metric tons	3,150	c/	210	c/	520	b/
	Rice (paddy)	Metric tons	3,210	b/	650	b/	2,500	c/
	Potatoes	Metric tons	1,000	b/	62	b/	335	b/
	Cattle (numbers)	Each	3,800	d/	200	d/	480	d/
	Hogs (numbers)	Each	2,880	d/	130.50	d/	615	d/
	Sheep and goats (numbers)	Each	600	d/	36	d/	80	d/
	Horses (numbers)	Each	4,750	d/	100	d/	800	b/

a. Useful but incomplete price data were available for these three countries: for Czechoslovakia, average wholesale prices as of 1 January 1948; 38/ for East Germany, planning prices (probably based on 1950 prices) as of 1 January 1953, 39/ and for Hungary, prices in effect on 1 July 1949, which appear to have been adopted for planning purposes. 40/ These data have been used as indicated below under b/ and c/. For cases in which price data for the country in question have not been used, see under d/, e/, f/, and g/.
b. Prices as given in the appropriate country sources referenced above under a/.
c. Prices based on those in the appropriate country sources referenced above under a/, which have been adjusted by production data.
d. Prices do not have a basis in local prices of the country in question, but instead have been derived either by conversion of another country's price by means of the official exchange rate or by analogy with the price structure of another country. In these cases the prices converted or used as analogous are as given in one of the sources referenced above under a/.
e. Index computed directly from physical units of production.
f. Index computed directly from aggregate estimate of production valued at 1950 rubles.
g. 1950 rubles.

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APPENDIX C

INDUSTRY OR INDUSTRY GROUP VALUE-ADDED WEIGHTS BY COUNTRY a/*

Table 23

Industry Sector Index	Bulgaria	Czechoslovakia	East Germany	Hungary	Poland	Rumania
Solid fuels	10.2	9.0	7.4	9.7	13.7	6.5
Ferrous metals	0.6	7.1	8.0	10.5	6.8	16.3
Nonferrous metals	1.0	1.2	1.2	3.3	4.5	0.2
Shipbuilding	2.7	0.6	1.3	2.2	0.8	2.3
Antifriction bearings	0.0	0.1	0.1	0.0	0.1	0.1
Construction equipment	0.7	1.2	1.1	0.0	1.7	0.0
Metalworking and machinery	1.4	2.7	1.3	1.1	1.1	0.8
Machine tools	0.2	2.9	1.8	1.8	0.5	0.2
Automotive equipment	1.0	3.2	4.8	7.0	0.3	2.1
Agricultural machinery	1.7	3.6	1.8	1.8	2.0	1.5
Railway equipment	2.2	4.2	3.4	2.6	3.8	1.8
Mining machinery	0.0	1.8	1.7	3.4	2.2	0.0
Textile machinery	0.7	1.6	0.9	1.0	1.2	0.3
Electrical equipment	2.5	3.1	3.2	4.3	2.3	1.6
Military end items	3.0	5.3	7.1	3.8	4.5	3.6
Petroleum and petroleum products	0.0	0.3	1.2	0.5	1.1	6.6
Light and textile industry	28.0	19.8	19.8	14.5	20.4	19.6
Chemicals and rubber	2.9	5.2	9.4	6.8	3.7	3.9
Electric power	3.7	3.0	2.7	2.1	3.2	2.7
Food processing	24.6	8.5	8.8	11.2	10.2	16.3
Construction materials	2.8	3.9	2.0	2.6	3.7	2.7
Forest products	6.4	6.2	5.6	3.6	5.5	6.9
Total	96.3	94.5	94.6	93.8	93.3	96.0
Producer Goods Subsector Index						
Solid fuels	10.2	9.0	7.4	9.7	13.7	6.5
Ferrous metals	0.6	7.1	8.0	10.5	6.8	16.3
Nonferrous metals	1.0	1.2	1.2	3.3	4.5	0.2
Shipbuilding	2.7	0.6	1.3	2.2	0.8	2.3
Antifriction bearings	0.0	0.1	0.1	0.0	0.1	0.1
Construction equipment	0.7	1.2	1.1	0.0	1.7	0.0
Metalworking and machinery	1.4	2.7	1.3	1.1	1.1	0.8
Machine tools	0.2	2.9	1.8	1.8	0.5	0.2
Automotive equipment	1.0	3.0	4.5	7.0	0.3	2.1
Agricultural machinery	1.7	3.6	1.8	1.8	2.0	1.5
Railroad equipment	2.2	4.2	3.4	2.6	3.8	1.8
Mining machinery	0.0	1.8	1.7	3.4	2.2	0.0
Textile machinery	0.7	1.6	0.9	1.0	1.2	0.3
Electrical equipment	2.5	3.1	3.2	4.3	2.3	1.6
Military end items	3.0	5.3	7.1	3.8	4.5	3.6
Petroleum and petroleum products	0.0	0.2	1.0	0.4	1.0	6.4
Electric power	2.8	2.4	2.2	1.7	2.6	2.1
Construction materials	1.8	2.6	1.3	1.7	2.4	1.9
Forest products	3.5	4.7	4.2	1.7	4.1	4.5
Total	38.9	62.5	62.9	64.8	59.3	56.1

* Based on 1952 employment data.

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Table 23
(Continued)

Consumer Goods Subsector Index	Bulgaria	Czechoslovakia	East Germany	Hungary	Poland	Rumania
Automotive equipment	0.0	0.2	0.3	0.0	0.0	0.0
Petroleum and petroleum products	0.0	0.1	0.2	0.1	0.1	0.2
Light and textile industry	28.0	19.8	19.8	14.5	20.4	19.6
Electric power	0.9	0.6	0.5	0.4	0.6	0.6
Food processing	24.6	8.5	8.8	11.2	10.2	16.3
Construction materials	1.0	1.3	0.7	0.9	1.3	0.8
Forest products	2.9	1.5	1.4	1.9	1.4	2.6
Total	57.4	32.0	31.7	29.0	34.0	39.9

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APPENDIX D

DERIVATION OF VALUE-ADDED WEIGHTS FOR THE INDUSTRY SECTORS, BY COUNTRY

In this appendix the development of value-added weights for industry is explained in detail. In general, these weights are based on estimates of employment by broad industry groups. The broad groups are broken down by one of two general methods: (1) analogy with industry weights for another country, and (2) use of production data of the subject country. It is to be noted that the weights developed from 1952 employment data were used to serve as 1950 weights. This assumes no change in the structure of industry during the period 1950-52.

To determine value-added weights by means of employment data (as is done in this report) interposes a difficulty in making intercountry comparisons of allocations of GNP by sector of origin, since there are considerable differences from country to country in labor productivity. Thus comparisons of trends of development of sectors among the various countries are more meaningful than comparisons of the relative or absolute magnitudes of the sectors at a given point in time. Two comparisons involving Rumania offer a clear illustration of the need for caution in making intercountry comparisons. In comparing the producer goods industries in Rumania and in Hungary, it appears that although employment is greater in Rumania, production in Hungary is more than double production in Rumania. Again, the value-added weights assigned to Rumanian industry indicate approximately the same proportion of industry distributed between producer and consumer goods as in Poland, whereas production data indicate that Poland produces a much greater volume of producer goods relative to consumer goods than is produced in Rumania. These comparisons imply not that the value-added weights derived from employment in any of these countries are necessarily in error but only that the method used does not correct to permit international comparisons on the sector level among countries with widely varying domestic cost and price structures.

1. Bulgaria.

Value-added weights for Bulgaria were developed for individual industry groups from estimates of that portion of the industrial labor force employed by each group, as shown in Table 24.* Breakdown

* Table 24 follows on p. 48.

Table 24

Reconciliation of Value-Added Weights
with Employment Data in Industry in Bulgaria
1952

Industry	Employment		Estimated Value-Added Weights	
	Number	Percent		
Solid fuels	30,000	11.9	10.2	
Ferrous metals	800	0.3	0.6	
Nonferrous metals	1,600	0.6	1.0	
Machinery and equipment	50,000	19.8	16.1	
Shipbuilding				2.7
Antifriction bearings				0.0
Construction equipment				0.7
Metalworking machinery				1.4
Machine tools				0.2
Automotive equipment				1.0
Agricultural machinery				1.7
Railroad equipment				2.2
Mining machinery				0.0
Textile machinery				0.7
Electrical equipment				2.5
Military end items				3.0
Petroleum and petroleum products	None	None	None	
Light and textile	82,000	32.4	28.0	
Chemicals and rubber	4,700	1.9	2.9	
Electric power	11,000	4.3	3.7	
Food processing	73,000	28.8	24.6	
Construction materials a/*			2.8	
Forest products a/			6.4	
Undistributed b/			3.8	
Total	253,000	100.0	100.0	

* Footnotes for Table 24 follow on p. 49.

Table 24

Reconciliation of Value-Added Weights
with Employment Data in Industry in Bulgaria
1952
(Continued)

a. The estimates used in constructing this table do not include construction materials and forest products. Value-added weights for these industries have been developed from East German experience and comparative data on output and value.
b. The undistributed weights are largely associated with local and cooperative industries, primarily light and food processing, but there are no presently available data to develop rational weights.

of the machinery and equipment complex into the constituents used for this report was accomplished by manipulation of fragmentary employment data from other sources, and by analogy with weights of other European Satellites.

Since production of forest products and construction materials was reported with agriculture and construction, respectively, the proportionality of value-added weights had to be modified to reflect the addition of these industry groups. Also, certain minor industry group weights were found to be inconsistent with reliable data on their value-added role in the Bulgarian economy, notably the chemical and metals groups. The value-added weights for these industries were adjusted to reflect this additional information.

2. Czechoslovakia.

Table 25* summarizes the data employed in developing the value-added weights for the Czechoslovak industry sector index. Employment data by major industrial category used were under a different industrial classification from that employed in this report. Employment in the production of construction materials was included in the employment data for the construction industry. This inclusion required a separate estimate of value added for construction materials, which was developed by analogy with East German industry. The value-added figure for the forest products industry was

* Table 25 follows on p. 50.

Table 25

Reconciliation of Value-Added Weights
with Employment Data in Industry in Czechoslovakia
1952

Industry	Employment		Estimated Value-Added Weights	
	Number	Percent		
Solid fuels	150,000	11.6	9.0	
Ferrous metals	95,000	7.3	7.1	
Nonferrous metals	N.A.		1.2	
Machinery and equipment	505,000	39.0	30.3	
Shipbuilding				0.6
Antifriction bearings				0.1
Construction equipment				1.2
Metalworking machinery				2.7
Machine tools				2.9
Automotive equipment				3.2
Agricultural machinery				3.6
Railroad equipment				4.2
Mining machinery				1.8
Textile machinery				1.6
Electrical equipment				3.1
Military end items				5.3
Petroleum and petroleum products	N.A.		0.3	
Light and textile	270,000	20.8	19.8	
Chemicals and rubber	86,000	6.6	5.2	
Electric power	50,000	3.9	3.0	
Food processing	140,000	10.8	8.5	
Construction materials a/*			3.9	
Forest products a/			6.2	
Undistributed b/			5.5	
Total	1,296,000	100.0	100.0	

* Footnotes for Table 25 follow on p. 51.

Table 25

Reconciliation of Value-Added Weights
with Employment Data in Industry in Czechoslovakia
1952
(Continued)

a. The estimates used in constructing this table do not include construction materials and forest products. Value-added weights for these industries have been developed from East German and Soviet experience and comparative data on output and value.
b. The undistributed weights are largely associated with local and cooperative industries, primarily light and food processing, but there are no presently available data to develop rational weights.

developed in the same fashion. The undistributed reference in the value-added column of Table 25 is a residual and is thought to be composed largely of local industries.

3. East Germany.

Value added was estimated for each industry and industry group as shown in Table 26.* Weights were allocated to various industries by comparison of production data for the industry or industry group with the production of identical industries in the USSR and other Satellites. The wealth of data on Germany allowed several independent checks of the value-added weights from what are considered reliable sources. Table 26 presents a reconciliation of three sets of value-added estimates, each apparently devised by conventional analysis rather than by analysis of labor force data. Two estimates, one for 1936 and one for 1950, were made by US government analysts from German statistics available for the specific years. The third estimate purports to be an East German estimate of the value added by each of the industry groups cited for 1950. 41/

4. Hungary.

Table 27** shows the allocation of value-added weights among various industries for Hungary. Comparative production data were used***

* Table 26 follows on p. 52.
** Table 27 follows on p. 53.
*** Continued on p. 54.

Table 26

Reconciliation of Value-Added Weights in Industry in East Germany
1936 and 1950

Sector	US Government Estimate of Value-Added Weights		East German Estimate of Value-Added Weights		Reconciled Estimate of Value-Added Weights	
	1936	1950	1950			
Solid fuels	4.26	6.69	6.0		7.4	
Metals	9.27	9.38	2.6		9.2	
Ferrous						8.0
Nonferrous						1.2
Machinery and equipment	25.41	23.72	24.70		28.5	
Shipbuilding						1.3
Antifriction bearings						0.1
Construction equipment						1.1
Metalworking machinery						1.3
Machine tools						1.8
Automotive equipment						4.8
Agricultural machinery						1.8
Railroad equipment						3.4
Mining machinery						1.7
Textile machinery						0.9
Electrical equipment	2.61	3.50	5.1			3.2
Military end items						7.1
Petroleum					1.2	
Light and textile	21.94	17.82	19.8		19.8	
Light	8.77	5.54	7.3			
Textile	13.17	12.28	12.5			
Chemicals and rubber	10.40	11.59	16.1		9.4	
Electric power	6.89	9.56	3.6		2.7	
Food processing	10.67	10.44	17.4		8.8	
Construction materials	5.84	5.52	3.6		2.0	
Forest products	5.34	5.28	8.2		5.6	
Lumber and wood processing	3.49	4.48	5.7			
Cellulose	1.85	0.8	2.5			
Undistributed	-0.02		-2.0		5.4	
Total	100.0	100.0	100.0		100.0	

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Table 27

Reconciliation of Value-Added Weights
with Employment Data in Industry in Hungary
1952

Industry	Employment		Estimated Value-Added Weights
	Number	Percent	
Solid fuels	60,000	11.0	9.7
Ferrous metals	65,000	11.9	10.5
Nonferrous metals	20,000	3.7	3.3
Machinery and equipment	182,000	33.4	29.0
Shipbuilding			2.2
Antifriction bearings			
Construction equipment			
Metalworking machinery			1.1
Machine tools			1.8
Automotive equipment			7.0
Agricultural machinery			1.8
Railroad equipment			2.6
Mining machinery			3.4
Textile machinery			1.0
Electrical equipment			4.3
Military end items			3.8
Petroleum and petroleum products	3,200	0.6	0.5
Light and textile	90,000	16.5	14.5
Chemicals and rubber	44,000	8.1	6.8
Electric power	11,000	2.0	2.1
Food processing	70,000	2.8	11.2
Construction materials a/*			2.6
Forest products a/			3.6
Undistributed b/			6.2
Total	545,200	100.0	100.0

* Footnotes for Table 27 follow on p. 54.

Table 27

Reconciliation of Value-Added Weights
with Employment Data in Industry in Hungary
1952
(Continued)

a. The estimates used in constructing this table do not include the construction materials and forest products. Value-added weights for these industries have been developed from East German experience and comparative data on output and value.
b. The undistributed weights are largely associated with local and cooperative industries, primarily light and food processing, but there are no presently available data to develop rational weights.

almost wholly to break down the machinery complex into a series of individual value-added weights for each industry group. In general, Hungarian output was compared with that of the Northern Satellites rather than the Balkan countries because of the greater efficiency of the Hungarian machine industry.

5. Poland.

The employment data used to develop value-added weights for the major industries and industry groups of the economy are shown in Table 28.* Where employment data and hence value-added weights were available only for large industry groups, breakdown of the group figure was accomplished by assigning to the individual industries a value-added proportionate to their production contribution to the group.

6. Rumania.

Value-added weights have been allocated to Rumanian industry groups on the basis of employment in each of these groups, as indicated in Table 29.**

* Table 28 follows on p. 55.
** Table 29 follows on p. 56.

Table 28

Reconciliation of Value-Added Weights
with Employment Data in Industry in Poland
1952

Industry	Employment		Estimated Value-Added Weights
	Number	Percent	
Solid fuels	300,000	18.8	13.7
Ferrous metals	150,000	9.4	6.8
Nonferrous metals	100,000	6.3	4.5
Machinery equipment	300,000	18.8	18.2
Shipbuilding			0.8
Antifriction bearings			0.1
Construction equipment			1.7
Metalworking machinery			1.1
Machine tools			0.5
Automotive equipment			0.3
Agricultural machinery			2.0
Railroad equipment			3.8
Mining machinery			2.2
Textile machinery			1.2
Electrical equipment			
Military end items			4.5
Petroleum and petroleum products	25,000	1.6	1.1
Light and textile	370,000	23.2	20.4
Chemicals and rubber	81,000	5.0	3.7
Electric power	45,000	2.8	3.2
Food processing	225,000	14.1	10.2
Construction materials a/*			3.7
Forest products a/			5.5
Undistributed b/			6.7
Total	1,596,000	100.0	100.0

* Footnotes for Table 28 follow on p. 56.

Table 28

Reconciliation of Value-Added Weights
with Employment Data in Industry in Poland
1952
(Continued)

a. The estimates used in constructing this table do not include the construction materials and forest products. Value-added weights for these industries have been developed from comparative data on output in Poland and other Satellite countries.
b. The undistributed weights are largely associated with local and cooperative industries, primarily light and food processing, but there are no presently available data to develop rational weights.

Table 29

Reconciliation of Value-Added Weights
with Employment Data in Industry in Rumania
1952

Industry	Employment		Estimated Value-Added Weights
	Number	Percent	
Solid fuels	50,000	7.8	6.5
Ferrous metals	125,000	19.3	16.3
Nonferrous metals	1,300	0.2	0.2
Machinery and equipment	92,000	14.3	14.3
Shipbuilding			2.3
Antifriction bearings			0.1
Construction equipment			0.0
Metalworking machinery			0.8
Machine tools			0.2
Automotive equipment			2.1
Agricultural machinery			1.5
Railroad equipment			1.8
Mining machinery			0.0
Textile machinery			0.3

Table 29

Reconciliation of Value-Added Weights
with Employment Data in Industry in Rumania
1952
(Continued)

Industry	Employment		Estimated Value-Added Weights
	Number	Percent	
Machinery and equipment (Continued)			
Electrical equipment			1.6
Military end items			3.6
Petroleum and petroleum products	50,000	7.8	6.6
Light and textile	150,000	23.2	19.6
Chemicals and rubber	30,000	4.7	3.9
Electric power	21,000	3.3	2.7
Food processing	125,000	19.4	16.3
Construction materials a/			2.7
Forest products a/			6.9
Undistributed b/			4.0
Total	644,300	100.0	100.0

a. The estimates used in constructing this table do not include the construction materials and forest products. Value-added weights for these industries have been developed from comparative data on output in Rumania and other Satellite countries.
b. The undistributed weights are largely associated with local and cooperative industries, primarily light and food processing, but there are no presently available data to develop rational weights.

APPENDIX E

VALUE-ADDED WEIGHTS FOR GNP SECTORS, BY COUNTRY

The development of value-added weights for GNP proceeded from published estimates by sector of NNP (factor cost), wages paid (for East Germany), and (for Rumania) by analogy with other European Satellite countries. It is to be noted that the breakdown by NNP was attributed to GNP without adjustment. This procedure leaves out capital consumption allowances and introduces some error. It also probably understates the industry sector and overstates the trade and services sectors. The results, however, while subject to refinement, are credible and reasonable.

1. Bulgaria.

The sector weights for Bulgaria, presented in Table 30, are calculated from UN data.

Table 30

Sector Weights Used in Constructing GNP Indexes for Bulgaria a/

Sector	Net National Product, Factor Cost (Million Leva)	Sector Weights
Industry	76.4	23.3
Agriculture	145.1	44.4
Transport and communications	14.6	4.5
Construction	2.7	0.8
Services	46.9	14.3
Trade	41.6	12.7
Total	327.3	100.0

a. 1946 data, in current prices. 42/

2. Czechoslovakia.

Table 31 indicates the sector weights assigned the income originating sectors of the Czechoslovak economy.

Table 31

Sector Weights Used in Constructing GNP Indexes for Czechoslovakia a/

Sector	Net National Product, Factor Cost (Billion Koruna)	Sector Weights
Industry	79.3	40.8
Agriculture	35.6	18.3
Transport and communications	15.7	8.1
Construction	9.3	4.8
Services	28.7	14.7
Trade	25.8	13.3
Total	194.4	100.0

a. 1947 data. 43/

3. East Germany.

The data employed in calculating weights for East Germany are shown in Table 32.*

4. Hungary.

The derivation of sector weights for the income-originating sectors of the Hungarian economy rests on a series of studies published in the early postwar period. Hungary had already instituted the Soviet system of reporting national aggregates on a material production basis, although limited data on service activities were still being reported.

* Table 32 follows on p. 61.

Table 32

Sector Weights Used in Constructing GNP Indexes for East Germany a/

Sector	Employees (Thousands)		Average Wage (1950 Deutsche Mark East)		Wage Bill (Million Deutsche Mark East)	Sector Weights
Industry	3,167.7		3,067		9,714	43.1
Artisans		575.0		2,770		
Wismut AG		242.0		4,039		
All other		2,350.7		3,039		
Agriculture	1,851.0 b/		1,900		3,517	15.6
Transport and communications	445.0		3,080		1,371	6.1
Construction	390.0		3,100		1,209	5.3
Services	1,226.0		2,600		3,616	16.0
Trade	1,137.0 c/		2,750		3,127	13.9
Total	8,216.7		2,861		22,554	100.0

a. 1950 data.
b. The agricultural employment total has been raised by 1 million persons, estimated to be those agriculture entrepreneurs and members of families who are actively engaged in agricultural employment. It has been assumed also that the average contribution of this group is equal to the average wage of farm workers whose services are compensated by money wages. This procedure unquestionably results in some overstatement of the agricultural sector, inasmuch as the majority of these persons are not agriculture entrepreneurs. It is thought, however, that less error is introduced to the agricultural section by this procedure than by any other procedure which attempts to meet the objection and remain comprehensible in a statistical sense.
c. The trade sector has been allocated 597,000 employees from the self-employed class. It has been assumed that the wage of these persons is equal to that obtained by persons engaged in trade and directly compensated by employers. It is thought that this procedure should secure an accurate allocation of the personal income from trade. Any error would probably be in a small understatement of the trade sector weight.

Table 33* indicates the sector weights assigned to the Hungarian economy. The services sector was developed exogenously and then inserted into the basic computation.

* Table 33 follows on p. 62.

Table 33

Sector Weights Used in Constructing GNP Indexes for Hungary a/

Sector	Net National Product, Factor Cost (Billion Forints) b/	Sector Weights
Industry	8.37	41.7
Agriculture	5.06	25.2
Transport and communications	0.62	3.1
Construction	1.12	5.6
Services	3.04	15.2
Trade	1.84	9.2
Net National Income	20.05	100.0

a. Data for the year 1947/48.
b. Net National Product at factor cost, January 1947 prices.

5. Poland.

Table 34* presents the derivation of weights for the income-originating sectors of the Polish economy. An adjustment has been made for the transport and communications sector and the services sector. Since the official figure of 2.7 percent of NNP for the transport and communications sector is too low in the light of other data available concerning Polish developments in this area, the ratios for the USSR and East Germany between the transport and communications sector and "other commodity production" (agriculture, industry, and construction) have been averaged, and the Polish ratio between these magnitudes has been correspondingly increased. Finally, the services sector has been reduced to the extent of the increase made in the transport and communications sector.

* Table 34 follows on p. 63.

Table 34

Sector Weights Used in Constructing GNP Indexes for Poland a/

Sector	Net National Product Market Prices (Billion Zloty)	Adjustments to US Concept (Billion Zloty)	Net National Product Market Prices US Concept (Billion Zloty)	Net National Product Market Prices US Concept (Percent)	Sector Weight
Industry	491.2	17.2 b/	508.4	29.4	29.4
Agriculture	524.5		524.5	30.3	30.3
Transport and communications	46.6		46.6	2.7	5.6 d/
Construction	51.9		51.9	3.0	3.0
Services		322.1 c/	322.1	18.6	15.7 d/
Trade	272.3		272.3	15.7	15.7
Other material production	5.3		5.3	0.3	0.3
Total	1,391.8		1,731.1	100.0	100.0

a. Official estimate for 1947.
b. This adjustment is made for military end items production, assumed to be two-thirds of expenditures for national defense, which totaled 25.7 billion zloty. 44/
c. This adjustment is made for omitted services on the basis of a UN estimate which indicates that transport and communications, services, and trade in 1948 were equal to about 60 percent of agriculture, industry, and construction. 45/
d. See accompanying explanation, p.

6. Rumania.

Table 35 presents a series of estimates of the proportion of GNP originated by the major producing sectors of the Rumanian economy. It was not possible to draw up accounts for Rumania describing income origination by sector by means of any of the methods employed for the other European Satellites. An average of the sector weights for Poland

Table 35

Sector Weights Used in Constructing GNP Indexes for Rumania

Sector	Sector Weights
Industry	26.4
Agriculture	37.4
Transport and communications	5.0
Construction	1.9
Services	15.0
Trade	14.2
Total	99.9

and Bulgaria was used with the results recorded in Table 35. It is thought that the weights are the best that can be devised with the time and data available. Nevertheless, these estimates are the least satisfactory from the point of view of supporting evidence of any developed for the European Satellites.

APPENDIX F

SOURCE REFERENCES

Documentation is not given for production data used in this report, which are those used for CIA/RR PR-99, Economic Conditions in the European Satellites, 11 February 1955. S, US OFFICIALS ONLY.

Evaluations, following the classification entry and designated "Eval.," have the following significance:

Source of Information	Information
Doc. - Documentary	1 - Confirmed by other sources
A - Completely reliable	2 - Probably true
B - Usually reliable	3 - Possibly true
C - Fairly reliable	4 - Doubtful
D - Not usually reliable	5 - Probably false
E - Not reliable	6 - Cannot be judged
F - Cannot be judged	

"Documentary" refers to original documents of foreign governments and organizations; copies or translations of such documents by a staff officer; or information extracted from such documents by a staff officer, all of which may carry the field evaluation "Documentary."

Evaluations not otherwise designated are those appearing on the cited document; those designated "RR" are by the author of this report. No "RR" evaluation is given when the author agrees with the evaluation on the cited document.

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